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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,882	08/04/2005	Paul Meldahl	1101.143US01	7390
24113 7590 09/18/2007 PATTERSON, THUENTE, SKAAR & CHRISTENSEN, P.A. 4800 IDS CENTER 80 SOUTH 8TH STREET MINNEAPOLIS, MN 55402-2100			EXAMINER HUGHES, SCOTT A	
			ART UNIT 3663	PAPER NUMBER
			MAIL DATE 09/18/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/519,882

Applicant(s)

MELDAHL, PAUL

Examiner

Scott A. Hughes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 5 and 24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-23 and 25-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/30/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group I and species A, a, Aa, Ba, and BB in the reply filed on 7/5/2007 is acknowledged. The traversal is on the ground(s) that no serious burden for examining all species has been shown. This is not found persuasive because the election/restriction detailed why the difference species do not share a special technical feature which defines a contribution over the prior art, and further each different species requires a different search and consideration (e.g. species of visible light requires a different search than species of sonar or acoustic waves). Since the species are directed to different embodiments, they require different searches and different considerations to determine patentability. Applicant's amendments and arguments that the election between i and ii is moot are persuasive.

Applicant has stated that claims 1-4, 6-23, and 25-32 read on the election.

The requirement is still deemed proper and is therefore made FINAL.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the monitoring devices

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mounted on a plurality of cables must be shown or the feature(s) canceled from the claim(s) (claims 20 and 31). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9-20 and 28-30 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 recites the limitation "A method of marine seismic exploration, as claimed in claim 1" in the preamble of the claim. There is insufficient antecedent basis for this limitation in the claim. Claim 1 is limited to a "Method of seismic exploration" and not "marine seismic exploration." Therefore, there is a lack of antecedent basis in claim 13 to recite that the method is for marine seismic exploration.

Claims 9, 11 and 13 recite the limitation of "the monitoring apparatus." Claims 1 and 2 contain a monitoring step, but do not recite that this is done by a monitoring apparatus. Therefore, there is a lack of antecedent basis for the limitation in claims 9, 11 and 13.

Claim 10 depends from claim 9 and is therefore also indefinite.

Claim 12 depends from claim 11 and is therefore also indefinite.

Claims 14-20 depend from claim 13 and are therefore also indefinite.

Claim 28 recites the limitation "An apparatus for marine seismic exploration, as claimed in claim 11" in the preamble of the claim. There is insufficient antecedent basis for this limitation in the claim. Claim 21 is limited to an "apparatus for seismic exploration" and not "marine seismic exploration." Therefore, there is a lack of antecedent basis in claim 28 to recite that the apparatus is for marine seismic exploration.

Claims 29-30 depend from claim 28, and are therefore also indefinite.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6-13, 16-19, 21-23, 25-28, 30, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Berni (5070483).

With regard to claim 1, Berni discloses a method of seismic exploration which comprises: generating a seismic event (Fig. 10) (Column 2; Column 5, Lines 1-10); applying the seismic event to the earth's surface (Fig. 10) (Column 2; Column 5, Lines 1-10); detecting a response to the event, the detected response including P-waves and S-waves in the earth's surface (Figs. 3-4) (abstract; Column 4, Line 44 to Column 5, Line 45; Columns 8-12; Column 18, Line 50 to Column 19, Line 62); and analyzing the detected response (Column 3, Line 45 to Column 5, Line 45; Column 7, Line 16, to Column 21); and in which: the detecting step comprises monitoring and recording the response to the seismic event in the form of movements of particles at the earth's surface (Column 4, Line 44 to Column 6, Line 45), from a position spaced from the earth's surface (Figs. 3-8) (Column 4, Line 44 to Column 6, Line 45), the detecting step being carried out over a response period, the response period being a predetermined period of time after the seismic event (abstract; Column 2; Column 3, Line 45 to Column 6, Line 45) (Fig. 9); and the analyzing step comprises analyzing the movements of

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particles at the earth's surface in the recorded response to the seismic event during the response period response (Column 3, Line 45 to Column 6, Line 45; Column 7, Line 16, to Column 21).

With regard to claim 2, Berni discloses that the movements of the particles are monitored using light, in the form of visible light (Column 5, Line 45 to Column 8, Line 19; Column 9; Columns 13-14).

With regard to claim 3, Berni discloses that the monitoring is carried out using monitoring apparatus which is moved relative to the earth's surface during the response period (Column 5, Line 10 to Column 6, Line 37; Column 12, Line 37 to Column 16, Line 56).

With regard to claim 4, Berni discloses that the analyzing step includes the elimination from the detected response of noise caused by the relative movement of the monitoring apparatus (Column 5, Line 10 to Column 6, Line 37; Column 12, Line 37 to Column 16, Line 56; Column 18, Line 24 to Column 20, Line 22).

With regard to claim 6, Berni discloses that the monitoring apparatus comprises several monitoring devices which are used simultaneously at different locations (Column 5, Line 10 to Column 6, Line 37).

With regard to claim 7, Berni discloses that the response is transformed to and recorded in digital form (Column 6, Line 23 to Column 8).

With regard to claim 8, Berni discloses that the analyzing step comprises analyzing surface particle displacements (Columns 5-6).

With regard to claim 9, Berni discloses that the monitoring apparatus comprises a source of coherent mono frequency light directed at the surface area being monitored, and a receiver for reflected coherent light (Columns 5-6; Column 7, Line 55 to Column 8, Line 3) (Figs. 2-8).

With regard to claim 10, Berni discloses that the coherent light and a reference beam are used to make speckle patterns by means of interferometry, and changes in the speckle patterns are analyzed in the analyzing step (Figs. 2-8) (Column 3, Line 45-68; Column 4, Line 46 to Column 6, Line 10; Column 6, Line 45 to Column 12).

With regard to claim 11, Berni discloses that the monitoring apparatus comprises video recording apparatus (Figs. 2-4) (Columns 6-10, 13).

With regard to claim 12, Berni discloses that the video recording apparatus includes one or more cameras operating on the basis of visible light. (Figs. 2-4) (Columns 6-10, 13).

With regard to claim 13, Berni discloses that the earth's surface is the seabed, the seismic event is applied to the sea or directly to the seabed and the monitoring apparatus is spaced above the seabed (Column 20, Line 63 to Column 21, Line 15).

With regard to claim 16, Berni discloses that the monitoring apparatus is towed (Column 5, Lines 10-45) and the analyzing step includes the elimination from the detected response of noise representing disturbances caused by the motion of the monitoring apparatus (Column 12, Line 55 to Column 16).

With regard to claim 17, Berni discloses that the particles whose movements are detected are sand particles on the sea floor (Column 20, Line 63 to Column 21, Line 15).

With regard to claim 18, Berni discloses that the seismic event comprises a seismic wave having a wavelength in the range 5 to 100 m and a duration of up to 3 s (Fig. 9) (Columns 1-2).

With regard to claim 19, Berni discloses that the response period is from 4 to 8 seconds (Fig. 9) (Columns 1-2).

With regard to claim 21, Berni discloses an apparatus for carrying out seismic exploration which comprises: means for generating a seismic event; means for applying the seismic event to the earth's surface (Fig. 10) (Column 2; Column 5, Lines 1-10); detecting apparatus for detecting a response to the event including P-waves and S-waves in the earth's surface (Figs. 3-4) (abstract; Column 4, Line 44 to Column 5, Line 45; Columns 8-12; Column 18, Line 50 to Column 19, Line 62); and means for analyzing the detected response (Column 3, Line 45 to Column 5, Line 45; Column 7, Line 16, to Column 21); and in which: the detecting apparatus comprises monitoring apparatus and recording apparatus arranged to monitor and record the response to the seismic event in the form of movements of particles at the earth's surface (Column 4, Line 44 to Column 6, Line 45), from a position spaced from the earth's surface (Figs. 3-8) (Column 4, Line 44 to Column 6, Line 45), over a predetermined response period after the seismic event (abstract; Column 2; Column 3, Line 45 to Column 6, Line 45) (Fig. 9).

With regard to claim 22, Berni discloses that the monitoring apparatus uses light, in the form of visible light (Column 5, Line 45 to Column 8, Line 19; Column 9; Columns 13-14).

With regard to claim 23, Berni discloses that the monitoring apparatus is movable relative to the earth's surface during the response period (Column 5, Line 10 to Column 6, Line 37; Column 12, Line 37 to Column 16, Line 56).

With regard to claim 25, Berni discloses that the monitoring apparatus comprises several monitoring devices which are used simultaneously at different locations (Column 5, Line 10 to Column 6, Line 37).

With regard to claim 26, Berni discloses that monitoring apparatus comprises a source of coherent light arranged to be directed at the area being monitored, and a receiver for reflected coherent light (Columns 5-6; Column 7, Line 55 to Column 8, Line 3) (Figs. 2-8).

With regard to claim 27, Berni discloses that the monitoring apparatus comprises video recording apparatus and the recorded response is a visual record (Figs. 2-4) (Columns 6-10, 13).

With regard to claim 28, Berni discloses that the earth's surface is the sea bed, the seismic event is arranged to be applied to the sea or directly to the sea bed and the monitoring apparatus is arranged to be spaced above the sea bed (Column 20, Line 63 to Column 21, Line 15).

With regard to claim 30, Berni discloses that the monitoring apparatus is towed (Column 5, Lines 10-45).

With regard to claim 32, Berni discloses deriving from the analyzing step, representations of subsurface layers; and assembling the representatives as a depiction of the geological structure of the region (Column 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berni as applied to claims 1-4, 6-13, 16-19, 21-23, 25-28, 30, and 32 above, and further in view of Donskoy (6134966).

With regard to claim 14, Berni does not disclose that the monitoring apparatus is located from 0.5 to 5 meters above the sea floor during the response period. Berni gives specifics of the apparatus for use in land surveys, but does not give the specifics of the apparatus for marine surveys. Berni mentions that the apparatus can be used in marine surveys, but does not disclose how it would be positioned. Donskoy teaches a method of monitoring seismic waves directed into the ocean bottom by monitoring the vibration of the seabed with a probe beam (Column 4). Donskoy shows in the drawings that the apparatus is located within 0.5 to 5 m above the seafloor (Figs. 1-6) (Columns 1-4). It would have been obvious to modify Berni to include locating the apparatus near

the seabed for marine surveys as taught by Donskoy in order to avoid receive the probe signals without interference from other objects located in the water column.

Claims 15, 20, 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berni as applied to claims 1-4, 6-13, 16-19, 21-23, 25-28, 30, and 32 above.

With regard to claim 15, Berni discloses that the monitoring apparatus additionally comprises a hydrophone (Column 19, Lines 40-61). Berni discloses that in marine surveys, it is known to record the pressure signal, and this done with a hydrophone.

With regard to claim 20, Berni discloses that the monitoring apparatus comprises a plurality of monitoring devices, the monitoring devices being spaced from each other by a distance which is less than the wavelength of the transmitted seismic event (Columns 5-6). Berni does not specifically disclose that the devices are located on cables, but does disclose that moving the devices would be as easy as moving marine seismic cable detectors. It is therefore obvious that the detectors could be located on a cable in order to be able to move them as is done in a marine survey using streamer cables.

With regard to claim 29, Berni discloses that the monitoring apparatus additionally comprises a hydrophone (Column 19, Lines 40-61). Berni discloses that in marine surveys, it is known to record the pressure signal, and this done with a hydrophone.

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With regard to claim 31, Berni discloses that the monitoring apparatus comprises a plurality of monitoring devices, the monitoring devices being spaced from each other by a distance which is less than the wavelength of the transmitted seismic event (Columns 5-6). Berni does not specifically disclose that the devices are located on cables, but does disclose that moving the devices would be as easy as moving marine seismic cable detectors. It is therefore obvious that the detectors could be located on a cable in order to be able to move them as is done in a marine survey using streamer cables.

Conclusion

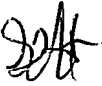
The cited prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A. Hughes whose telephone number is 571-272-6983. The examiner can normally be reached on M-F 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



SAH

/Jack W. Keith/
SPE AU 3663